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## Effect of Changing Climate on Erosion in Oke-Oyi Dam Agricultural Watershed, Ilorin, Nigeria

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### Abstract

Soil loss is one of the major problems resulting from water erosion in watersheds. Agricultural lands are constantly degraded by erosion and sometimes completely lost yet not much information on these occurrences is documented particularly for agricultural watersheds in Kwara State, Nigeria. Documented information of this nature could be a fundamental resource for land-use planning and commercial crop production in kwara state to ensure food security in Nigeria. Therefore a study was conducted in Oke-Oyi Dam watershed in Ilorin, Kwara State to estimate annual soil loss using the Revised Universal Soil Loss Equation (RUSLE) model with the aid of remote sensing and GIS techniques. Data on rainfall, soil erodibility, topography, cover management and support practice were collected. The rainfall erosivity of the study area is estimated to be  $83.48 \text{ MJ mm ha}^{-1} \text{ y}^{-1}$  and projected to reach  $94.17 \text{ MJ mm ha}^{-1} \text{ y}^{-1}$  in the next decade. Erodibility of the soil was found to be high and results indicated that the annual soil loss ranged from  $0\text{--}1272 \text{ t ha}^{-1} \text{ y}^{-1}$ . Soil loss in about 46 % (345 ha) of the study area was observed to be very low, less than 32 % (236 ha) of the study area falling within low and moderate soil loss class whereas 22 % (163 ha) of the study area suffered severe soil loss. The soil loss in the watershed fall far above the maximum tolerable limit of  $12 \text{ t ha}^{-1} \text{ y}^{-1}$  set by the Food and Agriculture Organisation (FAO) for sustainable land use. The total annual soil loss for the whole watershed is about  $30,000 \text{ t ha}^{-1} \text{ y}^{-1}$  with a mean soil loss of about  $40.02 \text{ t ha}^{-1} \text{ y}^{-1}$ , this figure is expected to continue to rise if adequate soil management measures are not expediently instituted. The precursors of soil loss in the study area were found to be low vegetation cover, unfavourable topographic factor and poor erosion support practice. In the long term, if the present erosion control practices of contouring is substituted with strip-cropping or terracing, soil loss will be reduced by 50.00 % and 79.99 % respectively.

**Keywords:** ArcGis, erosion hotspot, Oke-Oyi dam, soil loss, USLE, watershed